

## CLAIMS

What is claimed is:

1. A method for establishing a communication link between a user equipment (UE) and a base station in a communication system having a plurality of base stations which each transmit a common primary synchronization code (PSC) in a primary synchronization channel in conjunction with a base station specific secondary synchronization code (SSC) within a system frame, the method comprising:

receiving with the UE an input signal including the PSC and SSC from at least one of the base stations;

analyzing said input signal to detect received PSCs within a selected time period frame and determining a relative location of a strongest PSC within system frame; and

processing said input signal to remove the PSC from at least the determined PSC location, and detecting a secondary synchronization code at the determined location from the processed signal.

2. The method of claim 1 further comprising the step of detecting a scrambling code number for determining cell parameters of a base station associated with said detected SSCs.

3. The method of claim 2 wherein said removal of said detected PSC includes interference cancellation.

4. The method of claim 1 further comprising the steps of:  
processing said input signal to remove the PSC and SSC from at least the determined PSC location; and

detecting a scrambling code number from the processed signal for determining cell parameters of a base station associated with said detected SSC.

5. The method of claim 4 wherein said removal of said detected PSC and said SSC includes interference cancellation.

6. A communication system including a plurality of base stations which each transmit a common primary synchronization code (PSC) in a primary synchronization channel in conjunction with a base station specific secondary synchronization code (SSC) within a system frame, and a user equipment (UE) comprising a cell search system for establishing a communication link between a UE and a base station, the UE for receiving an input signal including the PSC and SSC from at least one of the base stations, said cell search system comprising:

- a first processor analyzing said input signal to detect received PSCs within a selected time period and determining a relative location of a strongest PSC within the system frame;

- a cancellation processor for processing said input signal to remove the PSC from at least the determined PSC location; and

- second processor for detecting said SSCs at the determined location from the processed signal.

7. The system of claim 6 wherein said cell search system further comprises a third processor, responsive to said SSCs, for detecting a scrambling code number of the base station associated with said determined location.

8. The system of claim 7 wherein said cancellation processor uses interference cancellation to remove said PSC from said input signal.

9. A user equipment (UE) comprising a cell search system for establishing a communication link between the UE and a base station in a communication system having a plurality of base stations which each transmit a common primary

synchronization code (PSC) in a primary synchronization channel in conjunction with a base station specific secondary synchronization code (SSC) at a different time within a system frame,

said UE receiving an input signal including the PSC and SSC from at least one of the base stations;

said cell search system comprising:

a first processor analyzing said input signal to detect received PSCs within a selected time period which has a duration corresponding to the length of a system frame and determining a relative location of a strongest PSC within the selected time period;

a cancellation processor for processing said input signal to remove the PSC from at least the determined PSC location; and

second processor for detecting said SSCs for the determined location from the processed signal;

said system using the detected SSCs to establish the communication link.

10. The UE of claim 9 wherein said cell search system further comprises a third processor, responsive to said SSCs, for detecting a scrambling code number of the base station associated with said determined location.

11. The UE of claim 10 wherein said cancellation processor uses interference cancellation to remove said PSC from said input signal.

12. A method for establishing a communication link between a user equipment (UE) and a base station in a communication system having a plurality of base stations which each transmit a common primary synchronization code (PSC) in a primary synchronization channel in conjunction with a base station specific secondary synchronization code (SSC) within a system frame, the method comprising:

receiving with the UE an input signal including the PSC and SSC from at least one of the base stations;

analyzing said input signal to detect received PSCs within a selected time period frame and determining a relative location of a strongest PSC within system frame;

detecting a secondary synchronization code at the determined location from said input signal; and

processing said input signal to remove the PSC and SSC from at least the determined PSC location.

13. The method of claim 12 further comprising the step of detecting a scrambling code number from the processed signal for determining cell parameters of a base station associated with said detected SSC.

14. The method of claim 2 wherein said removal of said detected SSC includes interference cancellation.